

AMENDMENTS TO THE CLAIMS
Marked-Up to Show Deletions and Insertions

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Currently Amended) A~~The web inspection system for detecting a plurality of~~
web flaws of a web, the web inspection system comprising:
a plurality of smart cameras for generating a digital pixel representation of a
portion of the web, each smart camera for detecting the plurality of web flaws
from the digital pixel representation and for generating output data comprising
a digitized image of each flaw of the plurality of web flaws and for generating
flaw location data for each flaw of the plurality of web flaws;
a host computer for controlling the web inspection system and for receiving and
displaying the flaw image data and the flaw location data; and

an ethernet for connecting the plurality of smart cameras to the host computer,
wherein the flaw image data and the flaw location data is transmitted over the
ethernet from the plurality of smart cameras directly to the host computer;

~~of claim 10,~~ wherein each smart camera of the plurality of smart cameras comprises:

- a line scan camera for generating the digital pixel representation of a portion of the web;
- a lighting uniformity and pixel sensitivity correction means for correcting each pixel of the digital pixel representation and for providing a corrected pixel representation;
- a web edge detector for detecting at least one edge of the web;
- a multi-pipeline pre-processor for filtering the corrected pixel representation, the multi-pipeline pre-processor for filtering the corrected pixel representation, the multi-pipeline preprocessor generating a prioritized data stream of potential flaws;
- a run length encoder for generating location data regarding a location of each group of the potential flaws in a cross direction; a blob detector for generating block data regarding the location of blocks of the potential flaws along a machine direction; and
- an inspect/reject analyzer for determining actual flaw data from the prioritized data stream of potential flaws.

12. (Original) The web inspection system of claim 11, wherein the multi-pipeline processor comprises:

- a plurality of filters for averaging the corrected pixel representation over a distance of the web along a machine direction of the web;
- a plurality of adaptive background subtraction channels connected to the plurality of filters, each adaptive background subtraction channel of the plurality of adaptive background subtraction channels producing a stream of subtracted pixel representations;

a plurality of thresholds, each thresholder of the plurality of thresholders connected to an output of an adaptive background subtraction channel of the plurality of adaptive background subtraction channels, each thresholder for grouping at least a portion of the stream of subtracted pixel representations and for producing a thresholder group output; and
a priority logic circuit for prioritizing the thresholder group output of each of the plurality of thresholders.

13. (Original) The web inspection system of claim 12, wherein the plurality of filters comprises:

- a background filter;
- a machine direction streak filter;
- a cross direction streak filter; and
- a small flaw filter.

14. (Original) The web inspection system of claim 12, wherein the plurality of thresholders comprises:

- a single pixel flaw detector;
- a uniformity detector;
- a machine direction streak detector;
- a cross direction streak detector; and
- a small flaw detector.

15. (Currently Amended) The web inspection system of claim 110, wherein each smart camera of the plurality of smart cameras detects the plurality of web flaws from the digital pixel representation at a contrast approaching a signal noise level.

16. (Cancelled)

17. (Currently Amended) The A method of claim 16, for low contrast web inspection of a web, the method comprising the steps of:

providing at least one smart camera for detecting at least one flaw on the web;
wherein detecting the at least one flaw on the web comprises the steps of:
generating flaw image data of the at least one flaw, the flaw image data
comprising an area of pixels of having a length and a width;
generating flaw location data for locating the at least one flaw on the web; and
transmitting the flaw image data and flaw location data over an ethernet
directly to a host computer;
and displaying the flaw image data and flaw location data on the host computer;
wherein the step of generating the flaw image data and flaw location data
comprises the steps of:
generating a pixel representation of the at least a portion of the web;
correcting the pixel representation for a lighting uniformity and a pixel
sensitivity;
filtering the corrected pixel representation utilizing a plurality of filters;
grouping the filtered corrected pixel representations to generate a plurality
of potential flaw data streams;
generating a prioritized data stream from the plurality of potential flaw
data streams;
generating cross direction location data regarding a location of the
prioritized data stream;
generating block data regarding the location of blocks of the prioritized
data stream along a machine direction; and
generating the flaw image data from the prioritized data stream of
potential flaws utilizing the cross direction location data and the block
data.

AMENDMENTS TO THE CLAIMS

Non Marked-Up

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Currently Amended) A web inspection system for detecting a plurality of web flaws of a web, the web inspection system comprising:
 - a plurality of smart cameras for generating a digital pixel representation of a portion of the web, each smart camera for detecting the plurality of web flaws from the digital pixel representation and for generating output data comprising a digitized image of each flaw of the plurality of web flaws and for generating flaw location data for each flaw of the plurality of web flaws;

a host computer for controlling the web inspection system and for receiving and displaying the flaw image data and the flaw location data; and
 an ethernet for connecting the plurality of smart cameras to the host computer, wherein the flaw image data and the flaw location data is transmitted over the ethernet from the plurality of smart cameras directly to the host computer; wherein each smart camera of the plurality of smart cameras comprises:

- a line scan camera for generating the digital pixel representation of a portion of the web;
- a lighting uniformity and pixel sensitivity correction means for correcting each pixel of the digital pixel representation and for providing a corrected pixel representation;
- a web edge detector for detecting at least one edge of the web;
- a multi-pipeline pre-processor for filtering the corrected pixel representation, the multi-pipeline pre-processor for filtering the corrected pixel representation, the multi-pipeline preprocessor generating a prioritized data stream of potential flaws;
- a run length encoder for generating location data regarding a location of each group of the potential flaws in a cross direction; a blob detector for generating block data regarding the location of blocks of the potential flaws along a machine direction; and
- an inspect/reject analyzer for determining actual flaw data from the prioritized data stream of potential flaws.

12. (Original) The web inspection system of claim 11, wherein the multi-pipeline processor comprises:

- a plurality of filters for averaging the corrected pixel representation over a distance of the web along a machine direction of the web;
- a plurality of adaptive background subtraction channels connected to the plurality of filters, each adaptive background subtraction channel of the plurality of adaptive background subtraction channels producing a stream of subtracted pixel representations;

- a plurality of thresholders, each thresholder of the plurality of thresholders connected to an output of an adaptive background subtraction channel of the plurality of adaptive background subtraction channels, each thresholder for grouping at least a portion of the stream of subtracted pixel representations and for producing a thresholder group output; and
 - a priority logic circuit for prioritizing the thresholder group output of each of the plurality of thresholders.
13. (Original) The web inspection system of claim 12, wherein the plurality of filters comprises:
- a background filter;
 - a machine direction streak filter;
 - a cross direction streak filter; and
 - a small flaw filter.
14. (Original) The web inspection system of claim 12, wherein the plurality of thresholders comprises:
- a single pixel flaw detector;
 - a uniformity detector;
 - a machine direction streak detector;
 - a cross direction streak detector; and
 - a small flaw detector.
15. (Currently Amended) The web inspection system of claim 11, wherein each smart camera of the plurality of smart cameras detects the plurality of web flaws from the digital pixel representation at a contrast approaching a signal noise level.
16. (Cancelled)
17. (Currently Amended) A method for low contrast web inspection of a web, the method comprising the steps of:

providing at least one smart camera for detecting at least one flaw on the web,
wherein detecting the at least one flaw on the web comprises the steps of:
generating flaw image data of the at least one flaw, the flaw image data
comprising an area of pixels of having a length and a width;
generating flaw location data for locating the at least one flaw on the web; and
transmitting the flaw image data and flaw location data over an ethernet
directly to a host computer;
and displaying the flaw image data and flaw location data on the host computer;
wherein the step of generating the flaw image data and flaw location data
comprises the steps of:
generating a pixel representation of the at least a portion of the web;
correcting the pixel representation for a lighting uniformity and a pixel
sensitivity;
filtering the corrected pixel representation utilizing a plurality of filters;
grouping the filtered corrected pixel representations to generate a plurality
of potential flaw data streams;
generating a prioritized data stream from the plurality of potential flaw
data streams;
generating cross direction location data regarding a location of the
prioritized data stream;
generating block data regarding the location of blocks of the prioritized
data stream along a machine direction; and
generating the flaw image data from the prioritized data stream of
potential flaws utilizing the cross direction location data and the block
data.